CHAPTER 5
METALS AND NON-METALS

SOLUTIONS

Textual question: (Page no.92)

Q.1. Name five metals and non-metals.

Ans:- Five metals : sodium, potassium, aluminium, magnesium and copper.

Five non-metals: sulphur, chlorine, bromine, hydrogen and carbon.

Q.2. Name one metal and one non-metal which exist in liquid state at room temperature.

Ans:- One metal that exist in liquid state at room temperature is mercury and the non-metal that exist as liquid is bromine.

Q.3. Give an example of metal which

i) Can be easily cut with a knife?

ii) Is the best conductor of heat?

iii) Is a poor conductor of heat?

Ans:-

i) Sodium

ii) Silver

iii) Mercury

Q.4. What is meant by saying that metals are malleable and ductile?

Ans:- Metals are malleable means they can be beaten into sheets and ductile means they can be drawn into wires.

Q.5. Which property of copper and aluminium make them suitable for making electric wires?

Ans:- The property of copper and aluminium being good conductors of electricity makes them suitable for making electric wire.

Q.6. Name a non-metal which conduct electricity.

Ans:- Carbon in the form of graphite.

Q.7. Write the equations for the reactions.

a) potassium with water

b) red hot iron with steam

c) zinc with dilute sulphuric acid

Ans:-

a) Potassium with water -

$$2K + 2H_2O \longrightarrow 2KOH + H_2$$

b) Red hot iron with steam -

$$3Fe + 4H_2O \longrightarrow FeOFe_2O_3 + 4H_2$$

c) Zinc with dilute sulphuric acid -

$$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$$

Q.8. How do metals differ from non-metals in their reaction with oxygen and product is dissolved in water.

Ans:- Metals react with oxygen to form basic oxide and basic oxide dissolves in water to form alkalis.

Eg.

$$4Na + O_2 \longrightarrow 2Na_2O$$

$$Na_2O + HO_2 \longrightarrow 2NaOH$$

Non-metals react with oxygen to give acidic oxides which ion dissolving in water form acids.

E.g.

$$S(s) + O_2\,(g) \longrightarrow 2SO_2(g)$$

$$SO_2(g) + H_2O(l) \longrightarrow H_2SO_3(l)$$

Textual Questions(Page No - 105)

Q1. Name two metals which are found in nature in the free-state.

Ans:- Gold and silver

Q2. Define the following terms – i) Mineral ii) Ores iii) Gangue

Ans:-

i) Mineral- The natural material in which the metals or their compounds are found in earth's crust is called minerals.

ii) Ores- Ores are those minerals from which metals can be extracted profitably.

iii) Gangue- The unwanted impurities such as earthy, sandy and rocky materials associated with the ores are called gangue or matrix.

Q.3. Differentiate between roasting and calcinations.

Ans:-

DIFFERENCE	
ROASTING	**CALCINATION**
1. It is the process of strong heating an ore in the presence of air	1. It is the process of heating an ore strongly in limited supply of air.
2. In this process, a sulphide ore is converted into oxide.	2. In this process, a carbonate ore is converted into oxide.

Q.4. Name two sulphide and two oxide ore.

Ans:-

Two sulphide ores – Iron pyrite (FeS), copper pyrite($CuFeS_2$)

Two oxide ores – Bauxite ($Al_2O_3 2H_2O$), Haematite (Fe_2O_3)

Q.5. Name the systematic steps involved in metallurgy.

Ans:-

(i) Concentration or enrichment of ores

(ii) Extraction of metal from the concentrated ores

(iii) Refining or purification of the impure metal

Q.6. Write the chemical process used for obtaining a metal from its oxide.

Ans:- The chemical process is reduction. In this process the oxides of metals are mixed with coke, carbon monoxide or other element which has high affinity for oxygen.

$$\mathrm{ZnO(s) + C(s) \xrightarrow{heat} Zn(s) + CO(g)}$$

$$\mathrm{Fe_2O_3(s) + 3C(s) \xrightarrow{heat} 2Fe(s) + 3CO\ (g)}$$

CO also acts as reducing agent

$$\mathrm{ZnO + CO \longrightarrow Zn(s) + CO_2}$$

Q.7. Give an example of a sulphide ore which is reduced to metal by heating alone. Give the relevant equation involved.

Ans:- Cinnabar (HgS) is the sulphide ore.

The relevant equation is

$$\mathrm{2HgS(s) + 3O_2(g) \xrightarrow{heat} 2HgO(s) + 2SO_2(g)}$$

$$\mathrm{2HgO \xrightarrow{heat} 2Hg(l) + O_2(g)}$$

Q.8. Why aluminium cannot be obtained by reduction of its oxide with coke?

Ans:-Aluminium cannot be obtained by reduction of its oxide with coke because the affinity of oxygen for the metal is greater than its affinity for carbon.

Q.9. Explain how the following metals can be obtained from their compounds by reduction process

(a) Metal X which is low in activity series.

(b) Metal Y which is moderately reactive.

(c) Metal Z which is high in the reactivity series.

Ans:-

(a) Metal X is low in reactivity the sulphur and oxides of these metals can be reduced to metals by heating alone.

Eg. $\mathrm{2HgS + 3O_2 \xrightarrow{heat} 2HgO + 2O_2(g)}$

$\mathrm{2HgO \xrightarrow{heat} 2Hg + O_2}$

(b) Metal Y is moderately reactive

The sulphide or carbonate ore of these metals is converted into corresponding metal oxides before reduction.

The oxides of this metal react with suitable quantity of coke on carbon monoxide on other elements having affinity for oxygen to form metal.

$$\text{E.g. } ZnO(s) + C(s) \longrightarrow Zn(s) + CO(g)$$

(c) Metal Z is highly reactive and has great affinity for oxygen. So the metal is obtained by electrolytic method.

Sodium can be manufactured by electrolysis of fused sodium chloride.

E.g. $NaCl(s) \xrightarrow{\text{fusion}} Na^+(l) + Cl^-(l)$

At cathode,

$$Na^+ + e^- \longrightarrow Na[\text{reduced}]$$

At anode,

$$2Cl^- \longrightarrow Cl_2 + 2e^-[\text{oxidation}]$$

Q.10. An alloy solder is used in electronic industry to join different electronic components. What are the constituents of their alloy?

Ans:- The constituents of solder is lead(40-60)% and tin(40 -60%).

Q.11. Which alloy is used for making bodies of aircrafts? What is the approximate composition?

Ans:- Duralumin is used for making aircrafts. The approximate composition is

Aluminium - 95%

Copper – 4%

Manganese – 0.5%

Magnesium – 0.5%

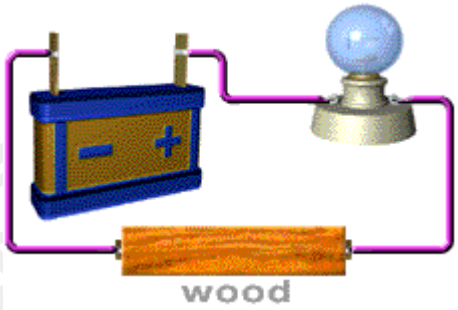
Textual Question (Page 107)

Q.1. Give five points to distinguish metals from non-metals.

Ans:- **Five points to distinguish metals from non-metals:**

DIFFERENCES	
METALS	**NON-METALS**
1. Metals are malleable and ductile	1. Non-metals are not malleable and ductile
2. Metals are good conductors of heat and electricity	2. They are poor conductors of heat and conductor electricity except graphite.
3. Metals are lustrous or shiny	3. Non-metals are not lustrous
4. Generally metals are strong and have high tensile strength	4. Generally they are weak and have low tensile strength
5. They have high melting and boiling point except mercury.	5. They have low melting and boiling point except carbon and silicon

Q.2. You are given a hammer, a battery, a bulb wires and a switch
(a) How would you use them to distinguish between samples and metals and non-metals.
(b) Assess the usefulness of these tests.
Ans:-
If the sample can be beaten into sheets by hammering, then the sample is a metal and if it is broken into pieces then it is non-metal.
An arrangement is set up as shown in the figure.



If the bulb starts glowing then the sample is metal, as metal is a good conductor of electricity.
If the bulb does not glow, then the sample is non – metal.
Usefulness of these tests:
These tests can be used for identifying metals with the exception of some metals like sodium, potassium.
Metals can be beaten into sheets and can be used to cover food items.
E.g. Aluminium foil.

Q.3. Frying pans and boilers are generally made of aluminium but not from steel.why? Give reasons.
Ans:- Frying pans and boilers are generally made of aluminium but not from steel because the thermal conductivity of aluminium is higher than steel and moreover it is resistant to corrosion.

Q.4. Distinguish between metals and non-metals on the basis of their chemical properties. Give three points.

Ans:-

DIFFERENCES	
METALS	**NON-METALS**
1. Oxides of metals are basic in nature	**1.** Oxides of non-metals are acidic or neutral in nature.
2. Metals react with dilute acids to release hydrogen.	**2.** Non-metals do not react with dilute acids.
3. Metals displace hydrogen from water.	**3.** Non-metals do not react with water.

Q.5. **What are amphoteric oxides? Give two examples of amphoteric oxides.**

Ans:-Those metal oxides which show basic as well as acidic behaviour are known as amphoteric oxides.

Eg. Aluminium Oxide and Zinc Oxide.

Q.6. **Name two metals which will displace hydrogen from dilute acids and two metals which will not displace.**

Ans:- Two metals which will displace hydrogen from dilute acids are mercury and zinc.

Two metals that will not displace hydrogen from dilute acids are– copper and silver.

Q.7. **Differentiate between i) mineral and ore ii) Alloy and amalgam**

Ans:-

(i) All minerals are not ores (e.g. Clay) while all ores are minerals (e.g. Bauxite and Cryolite).

(ii) An alloy is a mixture of a metal with one or more metals or non-metals whereas an amalgam is an alloy containing mercury as one of the constituents.

Q.8. **What are common methods of ore concentration?**

Ans:-The common methods of ore concentration are –

a) Gravity separation or hydraulic washing
b) Froth floatation process
c) Electromagnetic separation
d) Leaching

Q.9. **Name the process that is used to concentrate sulphide ore. Describe the stages that are involved in the conversion of concentrated sulphide ore into corresponding metal.**

Ans: Froth floatation process is used to concentrate sulphide ore.

The concentrated sulphide ore is roasted in the presence of oxygen and converted into oxides.

Eg. $$2ZnS(s) + 3O_2 \longrightarrow 2ZnO(s) + 2SO_2$$

The oxide is again reduced to metal by heating with coke.

$$ZnO(s) + C(s) \longrightarrow Zn(s) + CO(g)$$

The carbon monoxide so formed also act as reducing agent

$$ZnO(s) + CO(g) \longrightarrow Zn(s) + CO_2$$

Q.10. **How is impure metal refined electrolytically?**

Ans:- The impure metal is refined by the process of electrolytic refining in which –

(i) A thick block of impure metal is used as anode.
(ii) A thin strip of pure metal is used as cathode.
(iii) A water soluble salt of the metal to be refined is taken as electrolyte.

When electric current pass through the electrolyte, the pure metal from the anode pass into the solution in the form of metal ions. An equal amount of metal ions from the solution are deposited on cathode as pure metal.

The soluble impurities go into the solution but the insoluble impurities settle down below the anode as anode mud.

Q.11. What is an alloy? Write the composition and two uses of brass and bronze.

Ans: An alloy is a homogeneous mixture of one metal with one or more metal or non-metal which is fused in molten state.
The composition of brass is – 60 to 80% of copper and 0 to 40% of zinc.
Brass is used in making utensil, hardware and radiator cores etc.
Whereas, the bronze contains 75 to 90% of copper and 10 to 25% of tin.
Bronze is used in making statues, coins, cooking utensils etc.

PROBABLE AND LAST YEARS QUESTIONS

Q1. An elementary grey solid element 'X' is found to be good conductor of electricity. But, it posses a dull surface, is brittle and is not ductile. Is 'X' metal or non-metal?

Ans: It is non-metal. (Carbon in the form of graphite).

Q2. Draw a neat labelled diagram to illustrate that metals are good conductor of electricity.

Ans:

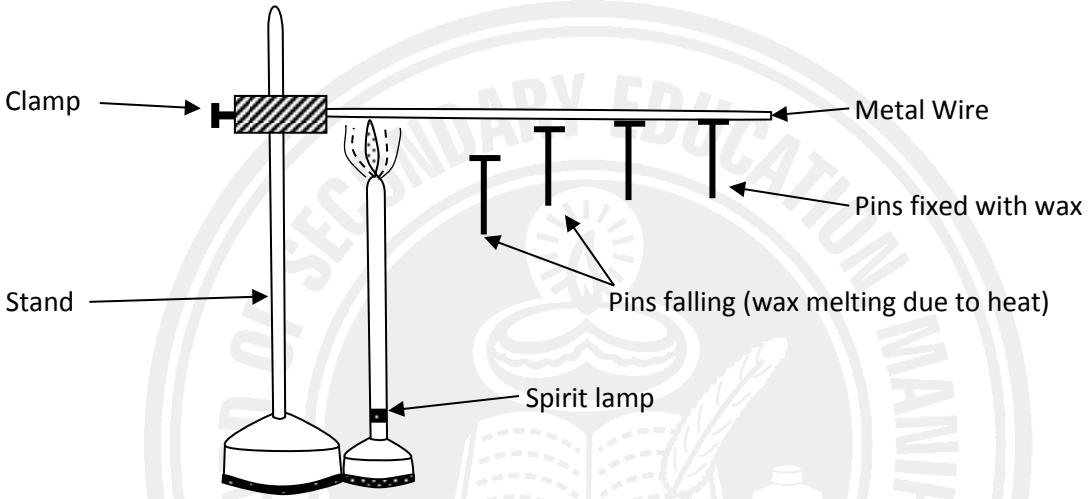


Fig. Metals are good conductor of heat

Q3. "We can't classify the elements sharply into metals and non-metals on the basis of their physical properties alone". Justify the statement by taking three suitable elements regarding hardness, melting point and electrical conductivity, respectively.

OR

Enumerate three exceptional properties regarding metal and non-metals.

Ans:

i) Hardness: Metals are generally hard but Na, Li, K are soft. Solid non-metals are generally soft but Carbon in the form of diamond is extremely hard.

ii) Melting point: Generally, metals have high melting point but Na, K, Ga, Cs have low melting point.

iii) Electrical conductivity: Metals are good conductor of electricity but lead is poor conductor of electricity.

Non-metals are bad (poor) conductor of electricity but Carbon in the form of graphite is a good conductor of electricity.

Q4. Sodium metal is added in cold water, it reacts with explosive violence and catches fire. Give equations for the reactions involved in the changes. The same is not observed in case of Fe (iron). Why?

Ans: Sodium reacts with water to form NaOH and H_2 gas which is an exothermic process. Hydrogen burns due to the heat produced during the reaction to form H_2O.

$$2Na(s) + 2H_2O\,(l) \longrightarrow 2NaOH\,(aq) + H_2\,(g) + Heat$$

$$2H_2\,(g) + O_2\,(g) \longrightarrow 2H_2O\,(l) + Heat$$

Fe does not react with cold water (but if oxygen is present in the water it will form rust).

Q5. Write two physical and one chemical properties of metal which are different from those of non-metals.

Ans:

i) Metals are malleable and ductile but non-metals are more non-malleable and ductile.

ii) Metals are sonorous but non-metals are non-sonorous.

Chemical properties: Metals can form basic oxide while non-metals can form acidic oxide.

Q6. Why is copper used in making electric cables and wires?

Ans: Copper is highly ductile and good conductor of electricity with high melting point.

Q7. What is atmospheric oxide? Give an example with relevant equations to support your answer?

Ans: Metal oxides which reacts with both acidic as well as base to produce salts and water are known as atmospheric oxide.

Aluminium oxide reacts with acids and bases in the following manner to form salt and water.

$$Al_2O_3(s) + 6HCl\,(aq) \longrightarrow 2AlCl_3\,(aq) + 3H_2O(l)$$

$$Al_2O_3(s) + 2NaOH \longrightarrow 2NaAlO_2\,(aq) + H_2O(l)$$

Q8. What are ores? What is the most important ore of Aluminium?

Ans: Ores are the minerals from which metals can be extracted profitably. Important ore of aluminium is bauxite ($Al_2\,O_3.2H_2O$).

Q9. What is metallurgy? How can chromium metal be extracted from its oxide ($Cr_2\,O_3$)? Write the reaction involved.

Ans: The various steps involved in the extraction of the metal from its ore followed by refining of the metal is called metallurgy.

Chromium is extracted from its oxide ore ($Cr_2\,O_3$) by heating with aluminium powder.

$$Cr_2\,O_3(s) + Al\,(s) \xrightarrow{\text{Heat}} Al_2O_3\,(s) + 2Cr(l) + Heat$$

Q10. Graphite is a good conductor of electricity and has shining appearance like metallic lustre. Why is it classified as a non-metal?

Ans: It is made up of Carbon which is a non-metal and can form acidic oxide and neutral oxide.

OR

It does not react with dilute acids or water.

Q11. Describe briefly the three essential steps required for the extraction of metal from its ore.

Ans:

i) Concentration or enrichment of the ore:

In this process, the ore is crushed into small pieces and different processes like gravity separation or hydraulic washing, froth floatation process, electromagnetic separation, leaching, etc. are done to remove unwanted impurities according to the nature.

ii) Extraction of metal from the concentration ore (reduction):

a) Metals of low activity series are extracted from their ores by simple heating with or without air.

b) Metals of middle reactivity series are first Calcined or roasted to convert the ore into metal oxide then reduced to metal with Carbon or more reactive metal like Aluminium according to the nature of the metal oxide.

c) Metals of high reactivity series are extracted from their ore by electrolytic reduction of the molten ore.

iii) Refining of impure metals: Impure metals are refined by method of electrolytic refining in which block of impure metal made as anode, a strip of pure metal made as cathode and solution of the salt metal made as the electrolyte.

Q12. Why are sulphide ores concentrated by Froth Floatation process?

Ans: Because sulphide ore are light ores which can easily wetted by oil and can float on water when bubbling.

Q13. Describe Leaching method for this purification of Bauxite ore. Write the reactions involved.

Ans: In this process, the crushed Bauxite ore ($Al_2O_3.2H_2O$) is treated with hot sodium hydroxide in which the aluminium oxide dissolves in the excess base forming soluble sodium meta aluminate.

$$Al_2O_3(s) + 2NaOH\ (aq) \longrightarrow 2NaAlO_2\ (aq) + H_2(l)$$

From Bauxite Hot Sodium meta aluminate

The solution is filtered to remove insoluble gangue particles. The filtrate when diluted with water and agitated, the newly added water reacts with the sodium meta aluminate present in the solution and give (formed) precipitate of aluminium hydroxide.

$$NaAlO_2(aq) + 2H_2O\ (l) \longrightarrow Al(OH)_3\downarrow + NaOH(aq)$$

Ppt.

The precipitate is filtered, dried and then heated strongly to get pure aluminium oxide (alumina)

$$2Al(OH)_3\ (s) \xrightarrow{\text{heat}} Al_2O_3(s) + H_2O(g)$$

Pure alumina

Q14. Describe the methods of reduction used for (i) metals of low activity and (ii) metals of high activity. Give example with relevant equations.

OR

With the help of suitable example describe the general method used for the extraction of metals of low activity from the concentrated ore.

Ans: The concentrated ore of sulphide and oxides of metal of low activity can be reduced by heating alone.

Mercury can be extracted from its Cinnabar ore (HgS) by heating alone. When it is heated in air, it is first converted into mercuric oxide (HgO) and further reduced to mercury on further heating in absence of air.

$$2HgS\ (s) + 3O_2\ (g) \xrightarrow{\text{heat}} 2HgO(s) + 2SO_2(g)$$

$$2HgO\ (s) \xrightarrow{\text{heat}} 2Hg(l) + O_2(g)$$

2nd Part:

Metals of high reactivity series can be reduced to metals by the method of electrolytic reduction.

For example sodium can be reduced from fused sodium chloride by electrolytic reduction method.

$$2NaCl\ (l) \xrightarrow{\text{electricity}} 2Na(s) + Cl_2(g)$$

Q15. What happens when a piece of lead metal is added to a pink cobalt chloride solution?

Ans: No change as lead is least reactive than cobalt.

Q16. Name a process for converting mercuric oxide to the liquid metal. (2016 N) 1m

Ans: Heating strongly/ Heat alone

$$2HgO\ (s) \xrightarrow{\text{heat}} 2Hg(l) + O_2(g)$$

Q17. Describe the process involved in the extraction of copper from copper glance Cu_2S.

Ans: The sulphide ore of copper (Cu_2S) is at first crushed into powder and concentrated by Froth Floatation process.

The froth is filtered, dried and heated strongly in presence of excess air to form (Cu_2O).

$$2Cu_2S\ (s) + 3O_2(g) \xrightarrow{\text{heat}} 2Cu_2O\ (s) + 2SO_2(g)$$

When, about one third (1/3 rd) of the Cu_2S has already converted into Cu_2O, the hot air supply is stopped. In doing so, the newly formed Cu_2O reacts with the remaining Cu_2S to form blister copper.

$$Cu_2S\ (s) + 2Cu_2O \xrightarrow{\text{heat}} 6Cu\ (s) + SO_2(g)$$

Impure copper

Refining of Copper:

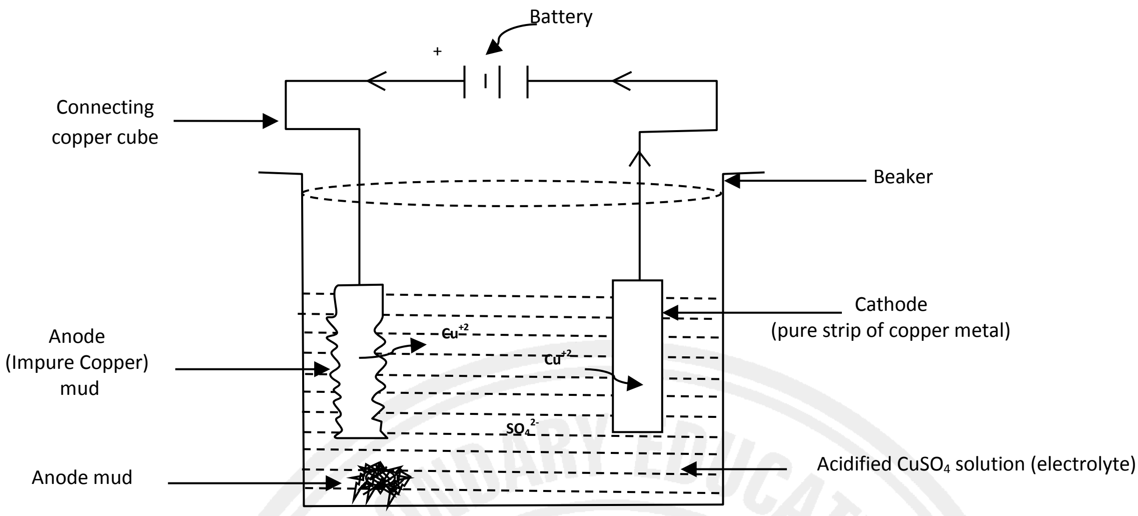


Fig. Electrolytic refining of copper

The impure copper metal is made as anode and a pure strip of copper metal is made as cathode. The electrolyte used here is acidified Cu_2SO_4 solution. When electric current passes through the electrodes the following reactions occurred to obtain pure copper metal at cathode.

At Anode: $Cu\ (s) \longrightarrow Cu^{2+}\ (aq) + 2e^-$

At Cathode: $Cu^{2+}\ (aq) + 2e^- \longrightarrow Cu\ (s)$

Impurities are formed as anode mud below the anode.

Q18. Draw a neat labelled diagram of the fitted apparatus used in electrolyte refining of copper.

Ans: *Please see above (electrolytic refining of copper)*

Q19. Draw a labelled diagram for the process used for the separation of tinstone ore from the gangue.

Ans:

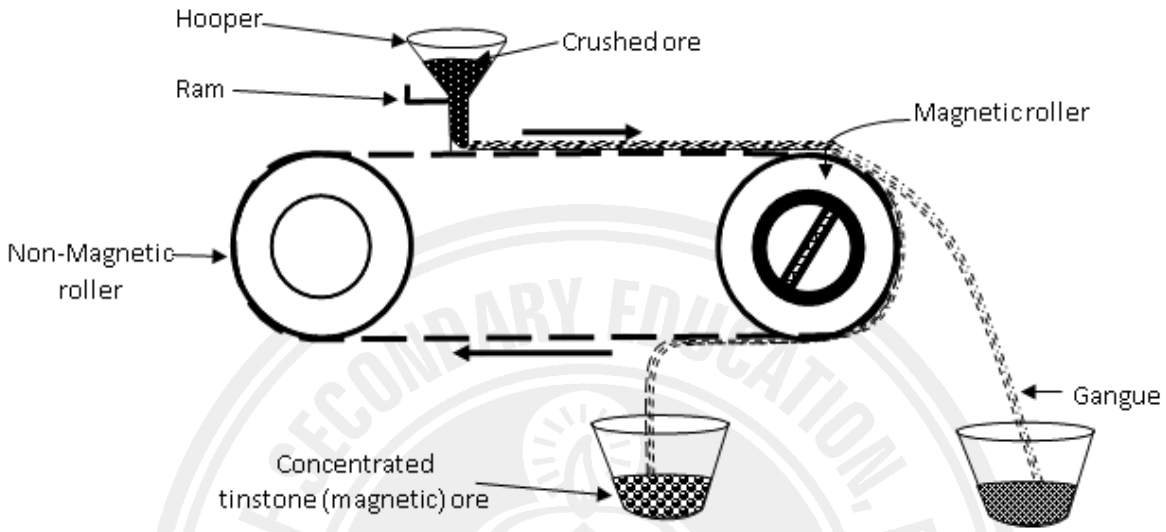


Fig. Magnetic Separation of tinstone magnetic

Q20. What is the difference between the terms roasting and calcination? Show the difference by using different ores of zinc. How is zinc metal obtained from the roasted or calcinated ore?

Ans: Roasting is the process of heating of a concentrated sulphide ore in presence of excess air while calcination is the process of heating of a concentrated carbonate ore in limited or in absence of air.

Roasting: $2ZnS\ (s) + \ 3O_2 \xrightarrow{\text{Heat}} 2ZnO\ (s) + 2SO_2(g)$

Calcination: $ZnCO_3\ (s) \xrightarrow{\text{Heat}} ZnO\ (s) + CO_2(g)$

Zinc metal is obtained from the roasted or calcined ore by heating with coke (Carbon) (Smelting process)

$$ZnO\ (s) + C(s) \longrightarrow Zn\ (s) + CO_2(g)$$

Carbon monoxide formed also acts as reducing agent. It further reduces the metal oxide (ZnO) to metal zinc.

$$ZnO\ (s) + CO(g) \longrightarrow Zn\ (s) + CO_2(g)$$

Q21. What is the major ore of lead? Name the method that would be used for its concentration. How can the metal be extracted from the concentrated ore? Give relevant equations.

Ans: The major ore of lead is Galena (PbS)

Method of concentration: Froth floatation process (method). The concentrated ore is filtered, dried and heated strongly in presence of excess air (roasting) to convert into lead oxide.

$$2PbS\ (s) + 3O_2(g) \xrightarrow{\text{heat}} 2PbO\ (s) + 2SO_2(g)$$

Reduction to metal: The roasted ore is mixed with suitable quantity of coke (carbon) and heated strongly to convert into lead metal.

$$PbO\ (s) + C(s) \xrightarrow{\text{heat}} Pb\ (s) + CO\ \ (g)$$

Carbon monoxide so formed also acts as reducing agent. It further reduces lead oxide into lead metal.

$$PbO\ (s) + CO(g) \longrightarrow Pb\ (s) + CO_2(g)$$

Q22. In an attempt to purify a metal, a student made the impure metal cathode. Will he be successful? Give design which with a fruitful.

Ans: No, he cannot be achieved his objective. The impure metal should be made anode.

Q23. Name a major ore of iron. How is the metal extracted from the ore? Give chemical equations.

Ans: The major ore of iron is Haematite $Fe_2O_3\ (s)$. The crushed ore of iron is concentrated by hydraulic washing and magnetic separation.

From, the concentrated ore, iron is extracted by reduction with coke (smelting).

$$Fe_2O_3\ (s) + C(s) \xrightarrow{\text{heat}} 2Fe\ (s) + 3CO(g)$$

Carbon monoxide formed also acts as a reducing agent. It further reduces the iron oxide into iron.

$$Fe_2O_3\ (s) + 3CO(g) \xrightarrow{\text{heat}} 2Fe\ (s) + 3CO_2(g)$$

Q24. Why is carbon reduction process not used in case of manganese dioxide? Describe the reduction of Manganese dioxide. Give the balanced equation.

Ans: Because, Manganese has higher affinity for oxygen than carbon, Manganese dioxide is reduced to Manganese by aluminothermic process (heating with aluminium).

Equation: $MnO_2\ (s) + 4Al\ (s) \xrightarrow{\text{heat}} 3\ Mn\ (l) + 2Al_2\ O_3(s)$ + Heat

Q25. How can chromium metal be extracted from its oxide ore (Cr_2O_3)? Write the reaction involved.

Ans: Chromium is extracted from its oxide (Cr_2O_3) by heating with aluminium powder.

$$Cr_2\ O_3\ (s) + Al\ (s) \xrightarrow{\text{heat}} Al_2\ O_3(s) + 2Cr\ (l) + \text{+ Heat}$$

Q26. What will happen when ferric oxide is heated with aluminium powder? Give chemical equation. What is the use of this reaction. (2008 N) 1+1+1=3m

Ans: They will form molten iron and aluminium oxide

$$Fe_2\ O_3\ (s) + Al\ (s) \xrightarrow{\text{heat}} 2Fe\ (l) + Al_2\ O_3\ (s)$$

This reaction is used for welding the broken parts of iron machinery, join railway tracks or cracked machines.

Q27. How are metals refined by electrolytic process? Describe briefly. (2018 P) 3m

Ans: ***Fig. Q17. (same)***

The procedure generally followed in this method is as follows:

i) The impure metal taken in the form of a thick block is made the anode in the electrolytic cell.

ii) A thin sheet of pure metal is made the cathode.

iii) A solution of the salt of the metal is taken as the electrolyte (electrolytic bath)

When an electric current is passed through the solution, the pure metal from the anode passes into the solution in the form of metal ions.

An equivalent amount of metal ions from the solution is deposited as pure metal on the cathode. The soluble impurities go into the solution whereas, the insoluble impurities settles down below the anode as the anode mud.

At Anode: $M\ (s) \longrightarrow M^{n+}\ (aq) + 2e^-$

At Cathode: $M^{n+} + e^- \longrightarrow M\ (s)$ [M represents the metal]

Q28. Why is electrolytic refining beneficial to us?

Ans: This process is not only purify the metal but also enable us to collect many valuable metals like gold, silver, etc.

Q29. What is alloy? Give one important advantage of an alloy over its components.

Ans: An alloy is a homogeneous mixture of metals with metals or metal with non-metals which are fused in molten state.

Alloys are more resistance to corrosion than their constituent metals.

Q30. What is an alloy? Give composition of brass.

Ans: ***Definition (Pl see Q.29)***

Composition of brass → Copper 60-80% and zinc 40-20%

Q31. Why an alloy of lead and tin is used for soldering?

Ans: Because the alloy has lower melting point than either of the two metals.

Q32. Alloys are usually harder than the parent metals. For example, steel is harder than pure iron and duralumin is much harder than pure aluminium. Name an alloy which is an exception.

Ans: Solder an alloy of lead (Pb) and Tin (Sn) is much softer than with Lead or Tin.

Q33. What are alloys? Give the composition of solder and zinc amalgam.

Ans: ***Definition (Pl see Q.29)***

Composition of

i) solder → Lead (40-60%), Tin (60-40%)

ii) Zinc amalgam → zinc and Mercury

****